Linking birds to management through habitat

And why we might want to know how habitats are changing in relation to ALMS trends

Saipan

Rota

Guam

Super Typhoon Paka
Dec 16, 1997 0744Z (0545 PM)

VCP estimates of Mariana Crows on Rota

	stations	detections	mean	95% CI
1982	211	52%	1318	1136-1564
1995	311	28%	486	299-789
1998	214	18%	264	138-504

Possible reasons for a declining Mariana Crow population

- **Habitat changes**
- **Introduced drongos**
- **Introduced predators (Monitor lizards, rats, feral cats, brown tree snakes)**
- **Disease**
- **Contaminants**
- **Human persecution**

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Generalized approaches to characterizing forest habitat for breeding landbirds

RESOLUTION/SAMPLING INTENSITY

	LOW	MEDIUM	HIGH
APPROACH	categorization (ocular estimation)	variable plot (BA by spp)	fixed radius (stem counts,DBH by spp)
GOAL	habitat classification & validation	forest, habitat management	model bird-habitat relationships
PRIMARY VARIABLES	% tree/shrub/herb cover by ht strata	BA by species/size classes (volume)	density,dominance, frequency by spp
PROS	quick & dirty	commercial/habitat management good precision	forest community structure,composition defined sample area
CONS	subjective poor precision	not comprehensive but repeatable	tedious sampling complicated analyses

Revised ALMS habitat data sheet

Land unit _____ Date _____
Block #_____ Observer _____
Point #_____ Elevation (m)_____ Aspect_____° Slope_____°

Habitat #___ of ___ % of 50-m circle___ Photo roll:___
Frame:___
Water: ☐ None ☐ Stream/river ☐ Pond/lake ☐ Ephemeral
Disturbance: ☐ Fire ☐ Logging ☐ Wind ☐ Other _____

TREE canopy cover (> 3m): ☐0 ☐1-9 ☐10-24 ☐25-59 ☐>60%

% coniferous: ☐<10% ☐10-25 ☐26-74 ☐75-89 ☐>90%

TREE LAYER species	% cover	Avg. ht 3-5	5-9	9-21	>21m
1._____	___	☐	☐	☐	☐
2._____	___	☐	☐	☐	☐
3._____	___	☐	☐	☐	☐
4._____	___	☐	☐	☐	☐

DWARF tree or SAPLING (< 3m): Total cover < 10%? ☐Yes ☐No

Layer	Avg. ht.(m)	% cover 0	1-9	10-24	25-59	>60%	Species (list)
1.		☐	☐	☐	☐	☐	_____
2.		☐	☐	☐	☐	☐	_____

SHRUB LAYERS (< 3m): Total cover <25%? ☐Yes ☐No

Layer	Avg. ht.(m)	% cover <25	25-74	>75%	Species (list for each layer)
1.		☐	☐	☐	_____
2.		☐	☐	☐	_____
3.		☐	☐	☐	_____
4.		☐	☐	☐	_____

HERB LAYER:			
Graminoids	☐	☐	☐
Herbs	☐	☐	☐
Ferns	☐	☐	☐
Horsetails	☐	☐	☐
MOSS/LICHEN:			
Mosses/hepatics	☐	☐	☐
Lichens	☐	☐	☐
Litter	☐	☐	☐
Bare ground/talus	☐	☐	☐

SOIL: ☐ Periodically tidal ☐ Wet ☐ Moist ☐ Well-drained, dry

CLASSIFICATION: Viereck: _____ Kessel: _____

Dead Wood Cover >3"(%) _____

Plot Burnt (%) _____

% Live Canopy _____

% Canopy Dead _____

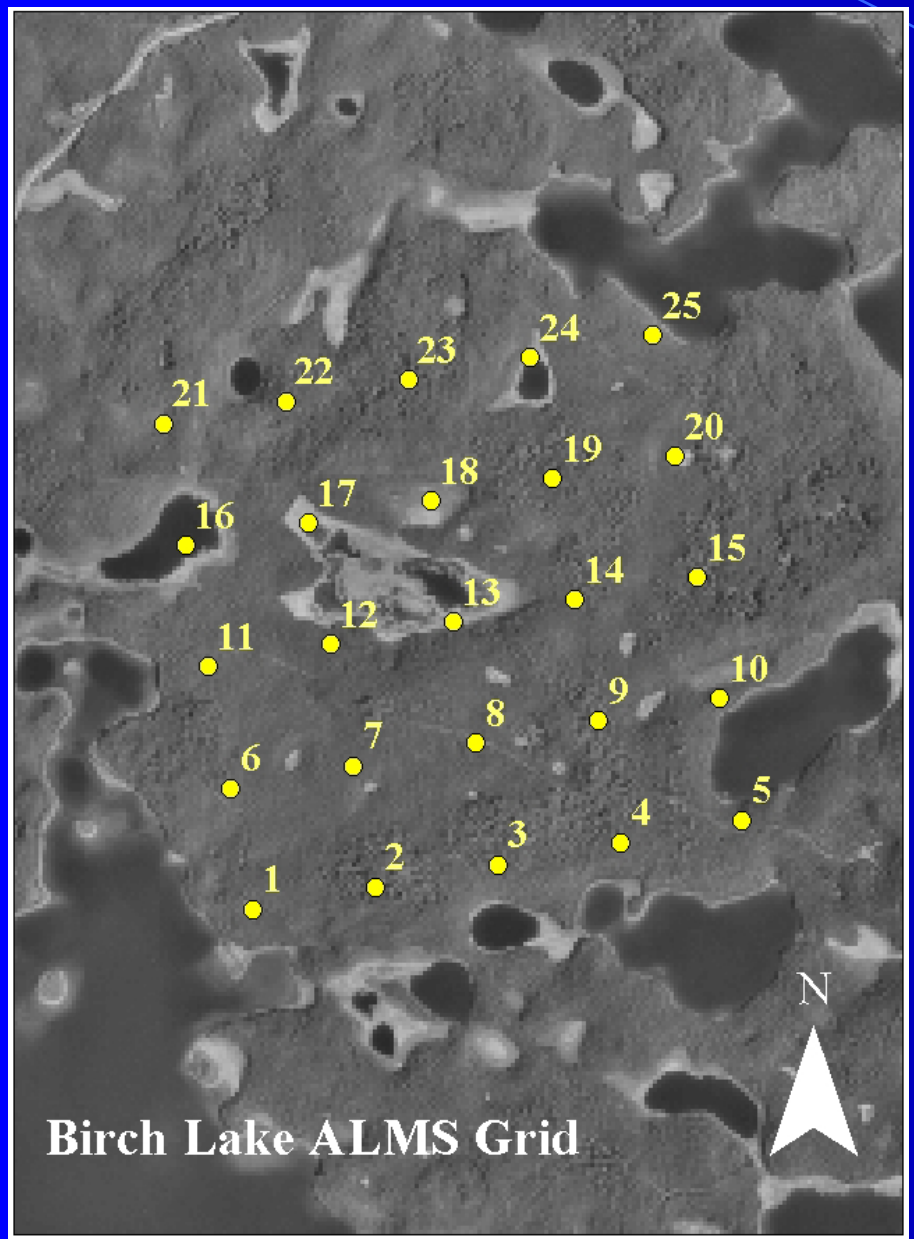
Total Shrub Cover (%) _____

% Shrubs Dead _____

			Present
TREES			
Populus tremuloides	Aspen	POTR	
Picea mariana	Black Spruce	PIMA	
Populus balsamifera	Cottonwood	POBA	
Tsuga mertensiana	Mountain Hemlock	TSME	
Betula papyrifera	Paper Birch	BEPA	
Picea glauca	White Spruce	PIGL	
SHRUBS			
Vaccinium uliginosum	Alpine Blueberry	VAUL	
Vaccinium spp	Blueberry Species	VACCI	
Andromeda polifolia	Bog Rosemary	ANPO	
Empetrum nigrum	Crowberry	EMNI	
Betula nana	Dwarf Birch	BENA	
Vaccinium caespitosum	Dwarf Blueberry	VACA	
Ledum palustre	Labrador-tea	LEPA	
Chamaedapne calyculata	Leatherleaf	CHCA	
Vaccinium vitis-ideaea	Lowbush Cranberry	VAVI	
Rosa acicularis	Prickley Rose	ROSE	
Menziesia ferruginea	Rusty Menziesia	MEFE	
Spirea beauverdinia	Spirea	SPBE	
FORBS			
Rubus chamaemorus	Cloudberry	RUCH	
Cornus canadensis	Dogwood	COCA	
Epilobium angustifolim	Fireweed	EPAN	
Rubus pedatus	Five-leaf Bramble	RUPE	
Polemonium acutiflorum	Jacob's Ladder	POAC	
Lupinus nootkatensis	Lupine	LUNO	
Potentilla spp	Potentilla	POTE	
Rhinanthus borealis	Rattlebox	RHBO	
Cordalis semprevirons	Rock Harlequin	COSE	
Geocaulon lividum	Timberberry	GELI	
Linnea borealis	Twin Flower	LIBO	
Achillia borealis	Yarrow	ACBO	
OTHER			
	Dog-ear Lichen	DOGE	
Equisetum spp	Horsetail	EQUI	
Cladonia	White Lichen	CLAD	
Lycopodium spp		LYCO	

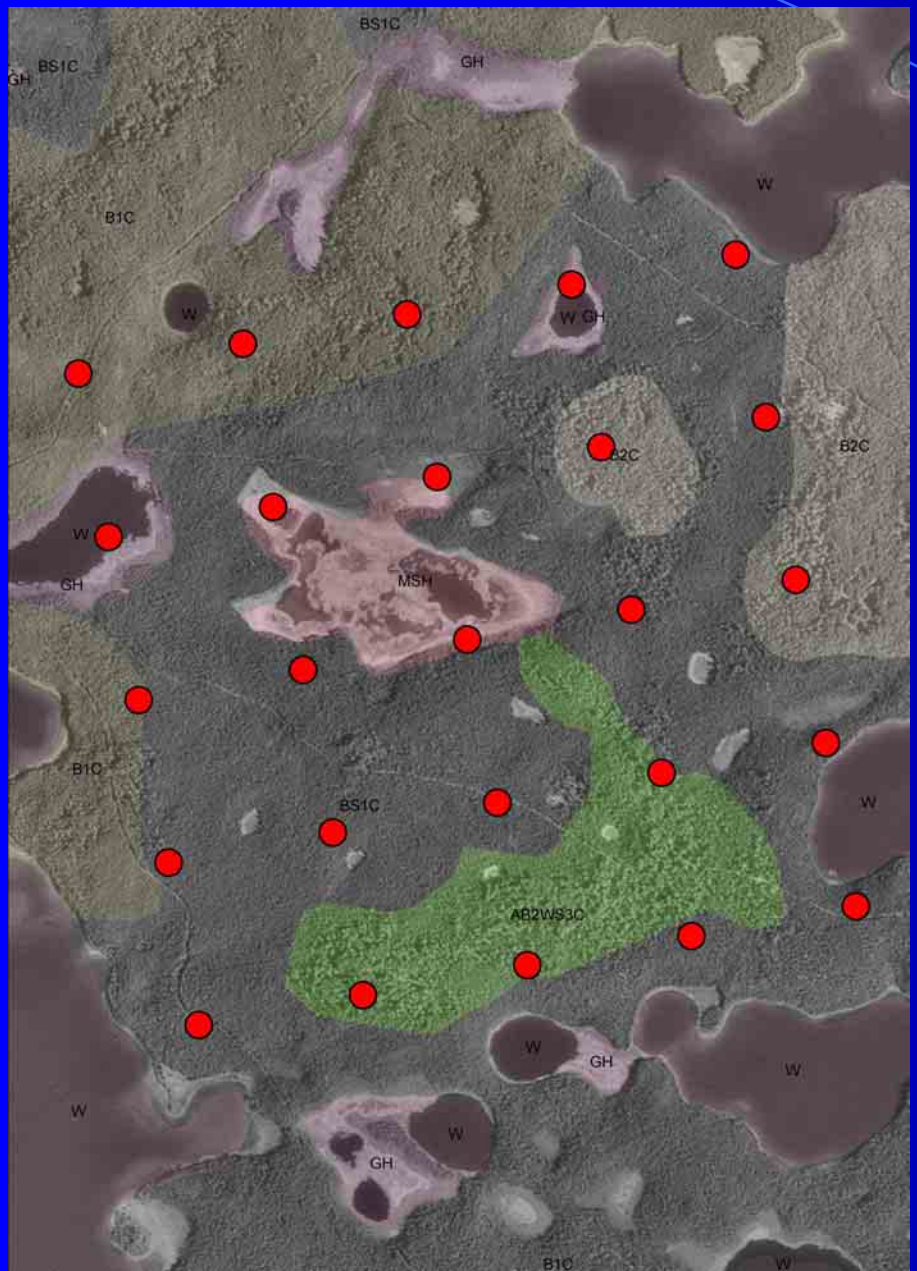
Additional Species

Bird community at Birch Lake (BCR4)



	% OCCUR
Ruby-crowned kinglet	80
Myrtle warbler	64
Slate-colored Junco	60
Varied thrush	56
Gray jay	32
Boreal chickadee	28
Common redpoll	20
American robin	16
Orange-crowned warbler	12

Habitats at Birch Lake (BCR4)



Habitat classification at Birch Lake

N	KPB	Description	HABITAT
12	BS1C	Black spruce, small closed canopy	BLACK SPRUCE
4	B1C	Birch, small closed	BIRCH
2	B2C	Birch, medium closed	
3	AB2WS3C	Aspen/Birch medium, White spruce large closed	MIXED
2	MSH	Marsh	WETLAND
2	GH	Graminoid/herbaceous	

BIRCH LAKE (BCR4)

	BLACK SPRUCE	MIXED	BIRCH	WETLAND
N	12	3	6	4
% CANOPY	61 (7)	55 (13)	73 (6)	33 (18)
% CONIFER	79 (6)	50 (0)	35 (9)	91 (3)
TREE ht (m)	7 (1)	12 (3)	14 (3)	5 (1)
SAPLING ht (m)	1.5 (0.2)	0.8 (0.2)	1.2 (0.4)	1.2 (0.4)
SHRUB ht (m)	0.3 (0.1)	0.3 (0.1)	0.4 (0.1)	0.1 (0.0)
% black spruce	51 (7)	27 (8)	20 (12)	33 (16)
% white spruce	3 (3)	2 (2)	10 (2)	
% paper birch	11 (2)	5 (3)	48 (11)	5 (4)
% aspen	tr	32 (9)	0	0
% GRAMINOIDS	2 (1)	4 (4)	6(3)	25 (14)

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Existing ALMS habitat sampling protocol

Characterizes forest habitat OK (relative accuracy)

However,

- **variables do not target defined classification scheme;**
- **ocular estimation lacks precision, has high observer bias (subjective), is inappropriate for a long-term monitoring program; and**
- **inappropriate sampling window?**

Vegetation Classification Systems

	Type	Species level	Comments
NVCS	hierarchal physiognomic/ floristic	alliance/ association	Federal mandate (vegetation); FGDC approved
NWI	hierarchal functional	representative spp 1:63,360	USFWS mandate (wetlands); widely used in regulatory arena
Viereck et al (1992)	hierarchal floristic	Levels 4,5	Widely used in AK for veg classification
Kessel (1979)	nonhierarchal physiognomic	representative spp	Avian habitats in AK

National Vegetation Classification System

7 classes, 22 subclasses, 63 groups, 218 formation, 1571 alliances, 4149 associations

Ecological System (Terrestrial)

I. Class (Forest)

I.A Subclass (Evergreen forest)

I.A.8 Group (Temperate or subpolar needle-leaved)

I.A.8.N Subgroup (Natural/semi-natural)

PHYSIOGNOMIC — **I.A.8.N.c Formation** (Conical-crown)

FLORISTIC — **I.A.8.N.c.4 Alliance** (Picea sitchensis)

Association (P. sitchensis/Empetrum nigrum; occurs in South Kenai)

Avian Habitat Classification for Alaska Kessel 1979 (29 habitats)

I. Fresh or brackish water
II. Marine waters
III. Unvegetated substrates
IV. Meadows
V. Shrubs
VI. **Forests and woodlands** (>5m)
   a. deciduous forest
   b. coniferous forest (>90% conifer)
   c. mixed deciduous-coniferous forest
   d. scattered woodland and dwarf forest
VII. Artificial habitats

Alaska Vegetation Classification

Viereck et al. 1992

I (3), II (11), III (30), IV (146), V (888)

LEVEL

I **I. Forest** (>3m tall, canopy>10%)

II **I.A. Conifer** (>75% needleleaf)

III **I.A.1 Closed forest** (canopy>60%)

IV **1.A.1.k. Black spruce** (canopy>25%)

V ***Picea mariana***

Ledum decumbens

Vaccinium vitis-idaea

***Cladonia* sp**

National Wetland Inventory
Cowardin et al. 1979
5 systems, 10 subsystems, 55 classes, 118 subclasses

System (Palustrine)
Subclass
Class (Forested wetland)
Subclass (Needle-leaved evergreen)
Examples (Picea mariana)

Modifiers

Water regime (tidal, flooded)
Water chemistry (salinity, pH)
Soil (mineral, organic)
Manmade (diked, farmed)

Vegetation classification at Birch Lake Cross-walking systems

N	NVCS	VIERECK	NWI	KPB
12	1IA8Nd	IA1,IA2,IC1,IC2,IIIC1	U, L1UBH	BS1C
4	1IB2Nb	IB1,IC1	U	B1C
2	1IB2Nb	IC2,IC1	U	B2C
3	1IC2Na	IC2	U	AB2WS3C
2	2VA8Nd	IIIA,IIIA2	U, PEM5H	MSH
2	2VA5Nc	IIIC1	PUBH,PEM5B	GH

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Recommendations

- Modify & simplify existing ALMS sampling scheme to clearly target the variables used in one classification system (Viereck et al.??)
- Ensure that sampling of those variables employs non-subjective methods that have high repeatability among observers; implement whenever birds are sampled or habitats change?
- Develop 2nd standardized method to better quantify vegetation structure & composition (variable plot?); implement during inventory
- Convene a working group to develop both protocols by spring 2004.

Patuxent Wildlife Research Center Bird Point Count Database

- Collaborative effort with American Bird Conservancy
- Intended for Partners in Flight participants
- Web-based database (data entry online)
- 67+ data fields
- Uses NVCS classification